

## **REMARKS/ARGUMENTS**

### **STATUS OF THE CLAIMS**

Claims 104-111, 113-140, and 286-300 are pending with entry of this amendment, claims 287-300 being added herein and claims 1-103, 112, and 141-285 having been cancelled previously. Claims 104 and 106 are amended herein. Claim 286 is withdrawn. These amendments introduce no new matter and support is replete throughout the specification. These amendments are made without prejudice to renewal of the claims in their original form and are not to be construed as abandonment or dedication of the previously claimed subject matter or agreement with any objection or rejection of record.

Claim 104 has been amended to more clearly claim desired embodiments of the invention by specifying that the small molecule is a semiconductive molecule. Support for the amendments can be found throughout the specification, e.g., at paragraph 30. Claim 106 has been amended for consistency with the amendments to claim 104.

Support for new claims 287-292 can be found, e.g., at paragraphs 139 and 301-311. Support for new claim 293 can be found, e.g., at paragraphs 135 and 137-140. Support for new claim 294 can be found, e.g., at paragraph 138. Support for new claims 295-300 can be found, e.g., at paragraphs 139 and 301-311.

Applicants submit that no new matter has been added to the application by way of the above claim amendments. Accordingly, entry of the Amendment is respectfully requested.

The action of September 12, 2008 included: election/restriction (item 1), discussion of priority (item 2), discussion of information disclosure statement submissions, claim rejections for alleged anticipation (item 3), and claim rejections for alleged obviousness (items 4-6). Applicants traverse all rejections and objections, to the extent that they may be applied to the amended claims, for the reasons noted herein.

### **THE ELECTION/RESTRICTION REQUIREMENT (ACTION ITEM 1)**

In response to the election of species requirement included in the action of September 12, 2008, Applicants confirm their election of species A. Claims 104-111, 113-140, and new claims 287-300 read on the elected species.

Applicants note that this election may not be taken as a dedication to the public of the non-elected species (or any other subject matter) and Applicants expressly reserve the right to pursue the non-elected claims and to traverse any restriction requirement that may be applied in any divisional or continuation application.

#### PRIORITY (ACTION ITEM 2)

Applicants note that the instant application as filed correctly claimed priority to U.S. Patent Application No. 10/656,802, which in turn claims priority to U.S. Provisional Patent Applications 60/452,038, 60/421,353, and 60/408,722.

In response to the Action's allegation that "Application Nos. 10/656802, 60/452038, 60/421353 do not contain subject matter such as 'the photoactive layer comprises a first population of discrete nanostructures and a small molecule, which small molecule is other than a dye, and wherein the photoactive layer is free of conductive polymer,'" Applicants note that support is provided in the priority applications. See, e.g., paragraphs 48, 121, 130, 141, 144, 148, and 154 of priority application 60/408,722 (incorporated by reference in priority applications 60/452,038 and 10/656,802). See also, e.g., priority applications 10/656,802 at paragraph 27, 60/452,038 at paragraph at paragraphs 29 and 46, and 60/421,353 at paragraphs 28 and 44.

#### THE INFORMATION DISCLOSURE STATEMENTS

Applicants note they have previously submitted two Information Disclosure Statements (Forms 1449) which were received by the Office on July 16, 2004 and July 27, 2004 (mail dates July 14, 2004 and July 23, 2004, respectively). In a telephone conversation with Monica Elrod-Erickson on February 2, 2009, the Examiner indicated these citations were considered in October 2007. The Examiner further indicated that copies of the 1449 documents would be provided to Applicants. If such copies have not already been mailed, Applicants respectfully request they be provided.

An additional Information Disclosure Statement is submitted herewith. Applicants request that the Examiner indicate consideration of the citation by initialing the 1449 document and providing a copy to Applicants.

THE CLAIMS ARE FREE OF DEN (ACTION ITEM 3)

Claims 104-110, 113-120, 123, 125-129, and 134-136 were rejected for alleged anticipation under 35 USC 102(e) by Den et al. (USPN 6,649,824). To the extent that the rejections are applied to the amended claims, or to new claims 287-300, Applicants respectfully traverse.

In order for a reference to anticipate an invention, the reference must teach each and every element of the claimed invention. Den, however, fails to teach all the elements of the claimed photovoltaic devices and thus fails to anticipate the claims at issue.

The Action alleges that Den teaches a photovoltaic device having a photoactive layer that includes a small molecule which is other than a dye, using the specific example tetrapropylammonium iodide (Action at page 6). Applicants note, however, that tetrapropylammonium iodide is a salt that ionizes in solution (see, e.g., Den column 2 lines 63-67), not a discrete molecule. Nonetheless, in the interest of expediting prosecution, Applicants have amended claim 104 as noted above to further emphasize distinctions between the small molecule of the instant claims and the electrolytic substances of Den, by specifying that the small molecule is a semiconductive molecule. Den teaches only redox pairs in their electrolytic solution (e.g., column 2 lines 63-67, column 3 lines 3-21, and column 13 lines 10-13); Den fails to teach a semiconductive small molecule as is specified in claim 104.

Additional points of distinction are present in the dependent claims, but because independent claim 104 is not anticipated it is not necessary to address each additional point. With respect to claim 105, however, Applicants note that, since Den fails to teach a semiconductive small molecule, Den also fails to teach nanostructures and the small molecule exhibiting a type II band offset energy profile. With respect to claim 109, while Den teaches an electrolytic solution, Den fails to teach a matrix comprising a small molecule in which nanostructures are disposed. With respect to claims 116-117, Den does not teach the indicated types of nanostructures.

With respect to new claims 293-300, Den does not teach a photovoltaic device with a photoactive layer including any of the specified small molecules (TPD,  $\alpha$ -NPD, or NPB).

Because Den does not teach at least a photovoltaic device that includes a semiconductive small molecule meeting the limitations of claim 104 or that includes TPD,  $\alpha$ -NPD, or NPB as specified in claim 293, Applicants respectfully request the rejections be withdrawn.

THE CLAIMS ARE NOT OBVIOUS (ACTION ITEMS 4-7)

Item 4

Claims 111 and 124 were rejected for alleged obviousness under 35 USC 103(a) over Den in view of Wariishi et al. (USPN 6,649,824). To the extent that the rejections are applied to the amended claims, Applicants respectfully traverse.

As recently reaffirmed by the Supreme Court in KSR International Co. v. Teleflex, Inc. (550 U.S. \_\_\_, 82 USPQ2d 1385 (2007)), the appropriate standard for analyzing questions of obviousness is that

“the scope and content of the prior art are determined, differences between the prior art and the claims at issue are analyzed and the level of ordinary skill in the pertinent art is resolved. Against this background the obviousness or non-obviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unresolved needs, failure of others, etc. might be utilized to give light to the circumstances surrounding the origin of the subject matter to be patented.

*Id.* quoting Graham v. John Deere of Kansas City 383 U.S. 1, 17-18.

This Graham v. John Deere standard has long been interpreted by the Office to mean that three requirements must be met for a *prima facie* case of obviousness. First, the prior art reference(s) must teach or suggest all of the limitations of the claims. Second, there must be a motivation to modify the reference or combine the teachings to produce the claimed invention (M.P.E.P. § 2143.01). Third, a reasonable expectation of success is required (M.P.E.P. § 2143.02).

A recent memorandum (dated May 3, 2007) from the Deputy Commissioner to the Technology Center Directors regarding the KSR/Graham standard reiterates that, while “The Court rejected a rigid application of the ‘teaching, suggestion, or motivation’ (TSM) test,” it “did not totally reject the use of ‘teaching, suggestion, or motivation’ as a factor in the obviousness analysis.” The memo concludes that “in formulating a rejection under 35 U.S.C.

§ 103(a) based upon a combination of prior art elements, it remains necessary to identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed.”. Similarly, guidelines for examination recently published in the Federal Register (vol. 72 no. 195 p. 57526-57535) also highlight the need for “clear articulation of the reason(s) why the claimed invention would have been obvious” (p. 57528).

Application of the KSR/Graham standard in the present case indicates that the claims at issue are not obvious.

First, the combination of Den and Wariishi fails to teach all the limitations of the claims. As described above with respect to claim 104, Den fails to teach at least a photoactive layer that comprises a semiconductive small molecule. Although the Action alleges that Wariishi teaches a nonconductive polymer and a flexible photoactive layer (which Applicants do not concede), merely adding these elements from Wariishi still fails to teach all the limitations of the claims.

In addition, motivation to combine the teachings of the references is lacking and there is no reasonable expectation of success, e.g., because the suggested combination does not result in the present invention

Applicants respectfully request that the rejections be reconsidered and withdrawn.

#### Item 5

Claims 121-122 and 130-133 were rejected for alleged obviousness under 35 USC 103(a) over Den in view of Sager (USPN 6,946,597). To the extent that the rejections are applied to the amended claims, Applicants respectfully traverse.

The combination of Den and Sager does not meet the requirements for a *prima facie* case of obviousness. First, the combination does not teach all the limitations of the claims. As described above with respect to claim 104, Den fails to teach at least a photoactive layer that comprises a semiconductive small molecule. Thus, even if Sager were to teach blocking layers such as those specified in claims 121-122 or device architectures such as those specified in claims 130-133 (which Applicants do not concede), merely adding these elements from Sager would thus still fail to teach all the limitations of the claims.

Furthermore, motivation to modify the teachings of the references is lacking. The Action alleges that Den in view of Wariishi teaches a flexible photoactive layer and that it

would therefore be obvious to have a non-planar, convex, or coiled device architecture. (Applicants note that the relevance of Sager to this allegation is unclear.) However, merely because a device is, *arguendo*, potentially capable of assuming such architectures does not mean it is obvious to form it into such configurations. No reason for doing so based on the art rather than on Applicants' disclosure has been identified. Since no rationale for modifying the teachings of the references has been established, the argument presented in the Action that the references be modified involves an improper hindsight reconstruction of the invention. Moreover, there is no reasonable expectation of success since the suggested combination does not result in the present invention.

Accordingly, Applicants respectfully request that the rejections be withdrawn.

Item 6

Claims 137-138 were rejected for alleged obviousness under 35 USC 103(a) over Den in view of Salafsky (USPN 6,239,355). To the extent that the rejections are applied to the amended claims, Applicants respectfully traverse.

The combination of Den and Salafsky does not meet the requirements for a *prima facie* case of obviousness. First, the suggested combination does not teach all the limitations of the claims. As described above, Den fails to teach all the limitations of claim 104 from which claims 137-138 depend. Merely adding a second photoactive layer or a second photoactive layer and third and fourth electrodes from Salafsky thus still fails to teach all the limitations of the claims.

In addition, motivation to combine the teachings of the references is lacking and there is no reasonable expectation of success, e.g., because the suggested combination does not result in the present invention

Applicants respectfully request that the rejections be reconsidered and withdrawn.

Item 7

Claims 139-140 were rejected for alleged obviousness under 35 USC 103(a) over Den in view of Bulovic (USPN 6,198,092). To the extent that the rejections are applied to the amended claims, Applicants respectfully traverse.

Again, the combination of Den and Bulovic does not meet the requirements for a *prima facie* case of obviousness. For example, the suggested combination does not teach all the limitations of the claims. As described above, Den fails to teach all the limitations of

claim 104 from which claims 139-140 depend. Merely adding a second photoactive layer and third electrode or a recombination material from Bulovic thus still fails to teach all the limitations of the claims. Furthermore, Applicants do not concede that the second electrode of Bulovic is equivalent to a recombination material as specified in claim 140.

In addition, motivation to combine the teachings of the references is lacking and there is no reasonable expectation of success, e.g., because the suggested combination does not result in the present invention

Applicants respectfully request that the rejections be reconsidered and withdrawn.

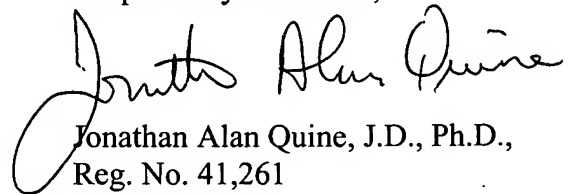
### CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the claims are deemed not to be in condition for allowance after consideration of this Response, a telephone interview with the Examiner is hereby requested. Please telephone Monica Elrod-Erickson at (510) 337-7871 to schedule an interview.

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Respectfully submitted,



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